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Integrity Of Natural Scientific Experience Of The World In The Elementary School

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Abstract

As a study course, «Natural science» in the elementary school is represented twice in the form of an integrative course as a system of natural sciences and a component of the "Outside world" study course. Double integrity establishes the specificity of teaching this course both in the elementary school and higher education institute. «Natural science» study course is represented by a plenty of both state and authoring programs. Such branching is generally specified by the process of education development, restructuring life in Russia and necessity of preparing people who are able to overcome a present-day stage of environmental problem development. A high degree of "Natural science" integrity makes it closer to philosophy and forces students, teachers in understanding the objective and content of the course to refer to such categories as the being and ways of its existence. Natural science is one of the main methods to experience the world. The being is an integral characteristic of the world which asserts its integrity through its existence. In accordance with high integrity of "Natural science" this work is studying the possibilities of using the laws of dialectics development, dialectic methods of experience in teaching "Natural science" and "Outside world".

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Key words: natural science, integrity, dialectics, natural scientific world view.

1. Introduction

It is important to mark out two factors for this work which are responsible for the relevance of elementary education improvement task at the present-day stage of the Russian society development. The first factor. Implementation of the developing teaching concept achievements in the works of Elkonin, Davydov and Galperin (2002) didn't result in modernization of the whole system of elementary education but remained an isolated island

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in the system of education. It causes the necessity of searching for new forms and ways to implement developmental teaching concepts into the school. The second factor. Fundamental broadening of forms of socializing and raising children including various types of mass media, professional education cause the necessity to improve school education in order to preserve and strengthen its leading role in the educational and pedagogic process. The section «Objectives, tasks and elementary education development trends» shows new tendencies of the educational process optimization specifying the change of educational paradigm two of which generally form modern educational trends: transitions from defining a teaching goal as adoption of knowledge, skills, abilities to defining an educational goal as the formation of an ability to learn as well as from the sterility of scientific concept system forming the content of the educational subject to the environmental paradigm of including the content of teaching into the context of a solution to life problems. At the present time design and research activity is appearing which ensures the transition from conventional education to education implementing a general principle of human being development. This article is describing the results of studying general principles of elementary school children development.

2. Branching of natural science teaching in the elementary school.

The studies of objective regularities and principles of teaching elementary school children over several decades occurred under the general idea of eliminating weak sides of conventional education. Works of this kind started intensively appearing after a large-scale experimental-pedagogical experiment under the guidance of Zankov (1975). It was found out that that the development of elementary school children in the condition of conventional methodology-based teaching is not the limit, didactic materials, which can be much more effective for the development of elementary school children than a traditional methodology, can be elaborated . A teaching concept focused on the establishment of the conditions for the development of a child personality is associated with the names of great teachers: Komenskiy, Pestalozzi, Ushinskiy and others (2005) there are examples of effective practical implementation of this humanistic concept. The significance of the pedagogical experiment under the guidance of Zankov (1975) lies in scientifically-based elaboration of a teaching system corresponding to this concept. Actual pedagogic conditions were established in order to embody the concept of developmental teaching in the school practice by competent and devoted teachers. Russian pedagogics has a number of developmental teaching concepts which are different in interpretation of this problem: the concept of Zankov (the system of Zankov, 1975), informatory teaching concept (the system of Davydov and Elkonin, 2002), step-by-step formation of mental actions concept, problem-based teaching concept, concept of Kalmykova etc. In order to get sight of natural science teaching branching, let us refer to the details of ”Outside world” study course implementation within didactic systems familiar to us. Special characteristics of the “School 2100” educational system include the fact that “The means of elementary school children upbringing and education is becoming familiar with an integral elementary scientific world view”. The authors of the work “The world around us” emphasize that “*We want the children to get acquainted with the world view and teach them to use it for the world comprehension and regularization of their own experience*”. According to them, school children will not be able to get familiar with an integral world view because they are studying the world separately during different subjects classesIf we take methodological recommendations for the teacher of four-year elementary school (the system of. Davydov and Elkonin), we can read the following lines: “ In the off ered course the educational subject is not the world view but the ways of its formation, methods of receiving knowledge about the outside world”. It is stated that the world view is always changing, most rapidly over the last years; familiarization with some of the world view certainly doesn’t give a child the opportunity to set and solve the problem when he encounters a new unknown phenomenon. Natural scientific world view and the concepts of modern natural science are the elements of the system of the human being familiarization with nature. If we want to familiarize children with the world view and teach them to use it for the knowledge of the world, we need to work according to the educational program “School 2100”; if we want to help children to learn the methods of the world view formation, we have to refer to Davydov and Elkonin didactic system. Is it possible to form the natural scientific world view in the process of “Outside world” educational course learning, the element of which is natural science, and familiarize children with the methods of its formation and methods of receiving the outside world knowledge?. Natural scientific world view is a set of interrelated scientific knowledge and concepts of nature generated at a certain stage of the society development . The concept of natural scientific world view is related to the concept of natural science. A concept is a particular way of understanding,

interpretation of some phenomena; the system of viewpoints explaining the attitude of the human being and society to nature. Natural scientific world view remains unchanged for a certain period of time, it changes when physical interpretations change. Eliminating dialectic contradictions revealed by physical research and theoretical physics forces to realize, make it more specific and revise the content of the existing knowledge and concepts of the nature, coordinate with new facts which are not explained within the previous natural scientific world view. The change of the content of the old knowledge sphere and filling it with new data is the main principle of natural scientific world view development. The theoretical base of the existing natural scientific world view plays the role of a filter in respect of new facts and events. If new facts are explained within the frame of the old paradigm, then the existing natural scientific world view is absorbing new facts, quantitative change is taking place. But if it is impossible to explain new facts by means of the existing theoretical base, it is necessary to change the facts and knowledge contained in the previous natural scientific world view in the way that they accord with new facts and events. Natural scientific world view absorbs new facts and changes the content of previously known meanings of the knowledge, their sense is simultaneously changing, the outlook of people is also changing. The outlook is a method of the world view formation. At the present stage of the human society development the most important form of learning is the science. The science can be rightfully defined as a sphere of generating new knowledge of nature, society. This generation is represented by groups of researchers with their knowledge and abilities, scientific institutions (institutes, universities, state research centers etc.), methods and specialized equipment for research work, the system of scientific information (scientific publications of researchers' works, scientific conferences, radio and television). Non-scientific forms of learning represent more ancient sphere of learning. These forms include the sphere of everyday learning represented by life-practical knowledge. The last one is the most important in mutual understanding of people and it acts as the basis for any other knowledge. Everyday learning is an undedicated cognitive activity which occurs and propagates during generation of ordinary conditions of life. Everyday learning of the environment follows the human being all life long. Science is originating in the sphere of everyday experience. Initially, science mostly studies those issues which participate in meeting life requirements of people and which the human being encounters in everyday practice. The ancient practice included adoption of life conditions prepared by nature itself. When nature depleted the resources of such conditions in the process of the change between the human being and nature, then the era of recovery of these conditions began, i.e. the era of generating new conditions due to transformation of inartificial nature into the artificial one. In the process of interaction with nature, the human being wants to construct a model of transformation and change of nature in order to anticipate the results of his practical activity. Historically, the period of consuming life conditions with work equipment created by nature prepared an environmental problem. This is the problem of interaction between the human being, society and nature. The required precondition of anticipation was the studying of consumed things, their properties and attitudes distinguished by the life process of exchange between the society and nature. Both things and their properties, as well as attitudes to them (i.e. the meaning of these things in life of people), were fixed in the human body, primarily in a special thinking organ called brain in the form of ideal objects. Thinking uses these ideal objects as specific items replacing real objects. Such thinking activity has formed on the basis of the practice, it represented an idealized view of practical transformation of material objects and within the limits of existing methods of practical learning of the outside world it allowed to anticipate the results of practical activity. In the process of knowledge and practice development, the method of knowledge formation by means of abstraction and classification of objective relations in the existing practice turns to be restricted for generalization of available knowledge, explanation of new properties and events, anticipation of applied areas of things and natural processes. Along with a method well-known in science, a new method of knowledge formation is being formed, the transition to nature proper scientific research is occurring. The transition to nature proper scientific research is characterized by separating scientific activity into an independent area of learning. Along with the practice of living needs satisfaction, scientific experimentation isolated from this practice and followed by scientific research of the obtained results is appearing. A scientific experiment and obtaining new results by means of theoretical studying both experimental data and knowledge itself are becoming a systematic, specially organized scientific activity. The basic form of modern scientific knowledge is represented by scientific theory. As opposed to empirical learning, theoretical learning is characterized by a completely different type of generalization. The process of empirical learning uses formal and logic generalization based on deflection (abstraction) of properties, characteristics, which repeat in a plenty of things, from objects. According to a general characteristic, things are attributed to one class, i.e. they are classified. This kind of generalization method is called "abstract-universal". In the process of theoretical learning, a generalization method allows to distinguish the universal in objects not nominally (not by the definition)

but actually. Similarity of objects appears in the unity of their origin, general principle of their relation and development. Theoretical learning understands the universal as a typical relation of numerous objects and events transforming them into the factors of unified integrity, a system. Two types of the studied material generalization distinguish two levels of scientific learning– theoretical and empirical. The empirical level is a perceptual-practical stage of learning, in this case common external characteristics of things and events are distinguished; this level represents the learning of the essence phenomena. Essential internal characteristics of things and processes which allow us to explain and substantiate phenomena are studied at the level of theoretical learning. At an empirical level, we directly deal with natural and social objects, at a theoretical level, idealized objects are studied (material point, perfect crystal and others).

3. Methods of traditional and dialectic world experience.

The logic is a theory of developmental laws of all material, natural and spiritual things. According to its form, the logical has three sides: 1) abstract, or rational 2) dialectic, or negatively rational 3) speculative, or positively rational (Gegel , 1975). These three sides are not three parts of the logic but the moments of any logically real. When the question is thinking in general, or, to be more precise, comprehension in concepts, they often mean only the activity of mind. The concept is no longer the definition of mind. The process of learning starts with the fact that available objects are experienced through their certain differences. For example, when nature is considered we differentiate substances, forces, species etc. and independently fix in this isolatedness of theirs. It is impossible to do without the mind not only in a theoretical but also practical sphere. Rational definitions are not the last result of learning, on the contrary, they are finite and have such nature that, driven to extremity, they turn into their opposite. A dialectic moment is when such finite definitions remove themselves and change to their opposite. Reflection is first of all the movement of thought going beyond isolated certainty and relating and linking it to other certainties in a way that although certainties are assumed in some connection but preserve their previous isolated significance. On the contrary, dialectics is an immanent transition of one definition into another where it is found out that these definitions of the mind are single-sided and restricted, i.e. they contain the negation of themselves. The essence of any finite thing is that it removes itself. Dialectics exists, therefore, an actuating soul of any scientific development of the thought is the only principle which introduces in the content of science immanent connection and necessity. The finite is restricted not only from outside but is removed due to its own nature and it changes into its opposite due to itself. Just because the negative is a result and it results from dialectics, at the same time it is the positive because it includes the thing that it originates from as the removed and it does not exist without the last-mentioned. But it already makes up the main definition of the third form of the logical. Dialectics is a method of object experience development, experience of the essence of phenomena. Dialectic thinking operates the results of rational thinking, i.e. definitions of phenomena, processes and things. Traditional didactics is restricted by studying rational definitions of phenomena, properties, object characteristics. The content of an object itself, what is available in things, i.e. the essence, remains unstudied. A concept is what lives in things themselves, it is something due to which they are what they are. Understanding an object means realizing its concept. To use the essence of an object, they use the method of rising form the abstract to the mental-specific. The constituents of this method are the requirements for identification of the beginning and research cell, orientation toward identification of essential relations between the elements of the system and aiming at detection of contradictions in the process of mental reproduction of the complete essence of an object. The content of the principle of rising from the abstract to specific includes all categories of dialectics, all developmental laws; they ensure the completion of its main goal, that is, mental, theoretical reproduction of the essence of an object under study. Dialectic activity, dialectic approach are general principles of school children development. In this regard, a conventional educational system is created based on the level of rational thinking, experimentally proved Zankov and Elkonin-Davydov (2002), systems were elaborated. Dialectic teaching under the guidance of Adamskiy is successfully developing (Dialectic teaching 2005)There are a number of traditional and developing systems of teaching which correspond to various moments and specific features of the integral whole of dialectic education as well as to the levels of thinking of both rational and sensible experience of the world. The integrity of natural scientific experience of the world in the elementary school satisfies both the development of children and the formation of their environmental consciousness.

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